



DOCKET NO. : SYCO-0011

PATENT



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Ari B. Naim

Serial No.: Not Yet Assigned

Group Art Unit: Not Yet Assigned

Filing Date: Herewith

Examiner: Not Yet Assigned

For: PORTABLE AUDIO PLAYBACK UNIT

EXPRESS MAIL LABEL NO: EL065978762US  
DATE OF DEPOSIT: September 30, 1999

Box

☒ Patent Application

☐ Provisional ☐ Design ☐ Sequence

Assistant Commissioner for Patents  
Washington, DC 20231

Sir:

PATENT APPLICATION TRANSMITTAL LETTER

Transmitted herewith for filing, please find

☒ A Utility Patent Application under 37 C.F.R. 1.53(b).

It is a continuing application, as follows:

☒ This application claims the benefit of U.S. Provisional Patent Application  
Serial No. 60/134,989 filed May 20, 1999 and U.S. Provisional Patent  
Application Serial No. 60/129,003 filed April 13, 1999.

09/409531-093060

Including the following:

- ☒ New or Revised Specification, including pages 1 to 11 containing:
- ☒ Specification
  - ☒ Claims
  - ☒ Abstract
- ☒ Two (2) Sheets of ☒ Formal ☐ Informal Drawings.
- ☒ An ☐ Executed ☒ Unexecuted Declaration or Oath and Power of Attorney.
- ☒ An ☒ Executed or ☐ Copy of Executed Earlier Statement Claiming Small Entity Status under 37 C.F.R. 1.9 and 1.27
- ☒ is enclosed.
- ☒ Return Receipt Postcard (should be specifically itemized).

**FEE CALCULATION:**

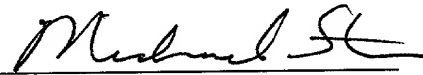
				SMALL ENTITY		NOT SMALL ENTITY	
				RATE	FEE	RATE	FEE
PROVISIONAL APPLICATION				\$75.00	\$	\$150.00	\$
DESIGN APPLICATION				\$155.00	\$	\$310.00	\$
UTILITY APPLICATIONS BASE FEE				\$380.00	\$ 380	\$760.00	\$
UTILITY APPLICATION; ALL CLAIMS CALCULATED AFTER ENTRY OF ALL AMENDMENTS							
	No. Filed	No. Extra					
TOTAL CLAIMS	14 - 20 =	-0-		\$9 each	\$-0-	\$18 each	\$
INDEP. CLAIMS	1 - 3 =	-0-		\$39 each	\$-0-	\$78 each	\$
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				\$130	\$	\$260	\$
ADDITIONAL FILING FEE					\$		\$
TOTAL FILING FEE DUE					\$ 380		\$

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- ☒ A Check is enclosed in the amount of \$ 380.00.
- ☒ The Commissioner is authorized to charge payment of the following fees and to refund any overpayment associated with this communication or during the pendency of this application to deposit account 23-3050. This sheet is provided in duplicate.
- ☐ The foregoing amount due.
- ☒ Any additional filing fees required, including fees for the presentation of extra claims under 37 C.F.R. 1.16.
- ☒ Any additional patent application processing fees under 37 C.F.R. 1.17 or 1.20(d).
- ☐ The issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance.
- ☒ The Commissioner is hereby requested to grant an extension of time for the appropriate length of time, should one be necessary, in connection with this filing or any future filing submitted to the U.S. Patent and Trademark Office in the above-identified application during the pendency of this application. The Commissioner is further authorized to charge any fees related to any such extension of time to deposit account 23-3050. This sheet is provided in duplicate.

**SHOULD ANY DEFICIENCIES APPEAR** with respect to this application, including deficiencies in payment of fees, missing parts of the application or otherwise, the United States Patent and Trademark Office is respectfully requested to promptly notify the undersigned.

Date: September 30, 1999

  
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**Applicant or Patentee:** Ari B. Naim

**Serial or Patent No.:** Not Yet Assigned **Attorney's Docket No.:** SYCO-0011

**Date Filed or Issued:** Herewith

**For:** PORTABLE AUDIO PLAYBACK UNIT

**STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR  
1.9(d) and 1.27(c)) - SMALL BUSINESS CONCERN**

I hereby declare that I am:

- ☒ the owner of the small business concern identified below:
- ☒ an official empowered to act on behalf of the concern identified below:

**NAME OF CONCERN:**  
**ADDRESS OF CONCERN:**

SYCOM TECHNOLOGIES, INC.  
1239 Parkway Avenue, Suite 100  
Ewing, NJ 08628

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that: (1) the number of employees of the concern, including those of its affiliates, does not exceed 500 persons; and (2) the concern has not assigned, granted, conveyed, or licensed, and is under no obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who could not be classified as an independent inventor if that person had made the invention, or to any concern which would not qualify as a small business concern or a nonprofit organization under this section. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in the

- ☒ specification filed herewith, with title as listed above.
- ☐ application identified above.
- ☐ patent number identified above.

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights in the invention is listed below\* and no rights

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to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).

**\*NOTE:** Separate statements are required for each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

**FULL NAME:**

**ADDRESS:**

☐ **INDIVIDUAL** ☐ **SMALL BUSINESS CONCERN** ☐ **NONPROFIT ORGANIZATION**

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

**NAME OF PERSON SIGNING:**

Ari Naim

**TITLE IN ORGANIZATION:**

Managing Director

**ADDRESS OF PERSON SIGNING:**

1239 Parkway Avenue, Suite 100  
Ewing, New Jersey 08628

  
**SIGNATURE**

September 29, 1999  
**DATE**

**PORTABLE AUDIO PLAYBACK UNIT****Cross Reference**

This application relates to, and is entitled to the benefit of the filing date of, U.S.

- 5   Provisional Patent Application Serial No. 60/134,989 filed May 20, 1999, titled "Portable Audio Playback Unit" (attorney docket SYCO-0010) and U.S. Provisional Patent Application Serial No. 60/129,003 filed April 13, 1999, titled "Portable Audio Player" (attorney docket SYCO-0009).

10   **Overview**

The subject device is a Portable Audio Playback Unit, in which audio content can be written, stored, and retrieved. In addition, the unit can intelligently interact with the user, displaying non-audio information, accepting input from the user through a keyboard interface, and collecting statistics on the unit's usage.

15

Two block diagrams, Figures 1 and 2, depict alternative embodiments of the inventive device. The significant difference between the two embodiments is that one employs a Static Random Access Memory (SRAM), while the other does not. This, and other differences, are a matter of economics and availability of devices, and do not affect the overall function of the unit. Accordingly, the descriptions that follow relate to either block diagram as appropriate.

20

One particularly important aspect of the present invention is the use of a hard drive (such as the kind typically used in a laptop or notebook computer), which is a delicate and high power consuming device. Therefore, to use a hard drive in a portable, hand-held audio player, we had to find a way to both protect and reduce the power consumption of the hard drive.

25

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In particular, the hard drive is subject to breakage if operated while the device is not stationary. This poses a significant problem for a portable, typically hand-held, device. In the present invention, we dealt with the ease of breakage in two ways: First we conducted a careful mechanical study to find the thickness of a reasonably available absorption material needed to be used to pass a 1 meter drop test. We discovered that 0.8 inches of such material is sufficient to protect the hard drive. Second, we devised a secondary stationary memory concept to be used as the active system during playback or recording. Here, the hard drive uploads an hour or so of material to the solid state memory and locks the drive. This process takes about 7 seconds. Thus, the disk medium is normally locked, especially while the unit is being carried about by the user.

The aforementioned power consumption problem was solved using the secondary memory as well, since the drive only needs to spin momentarily.

15 The various components of the presently preferred implementation will now be described.

#### Computer

20 This device is external to the subject Portable Audio Unit, and is shown for clarity and completeness. When the Unit is attached to the Computer, communication between the two can be achieved. Such communication may be done via a parallel port, a serial port, ATA bus or any other convenient means. Through this port, both audio and non-audio content is downloaded to the Unit, and Unit usage statistics are uploaded. If the Unit is used as a recorder, this port can be used to upload the recorded content to the Computer.

25

#### SYC801/SYC810

The components labelled SYC801 and SYC810 in Figures 1 and 2 are each a Digital Signal Processor (although the invention may employ any suitable type, not only those

- types explicitly shown), in which the major program for the overall operation of the Unit executes. The functions of this program are manifold, and include communication with the Computer, reading/writing data from/to the Flash and Disk memories, compressing and de-compressing audio data, and communicating with the Microprocessor and
- 5 Computer.

### OSC

This Oscillator supplies the clock necessary for the operation of the DSP, and may be set at any convenient frequency, not just the 12.2880 MHz explicitly shown.

10

### Microprocessor/Display/Keys

- The microprocessor executes a program which interprets Key depressions from the user, and provides visual feedback and prompts on the Display. In addition, the Microprocessor program contains a Clock function, by which messages and prompts
- 15 keyed to date and/or time can be activated without burdening the DSP which typically requires more power for this function.

### Flash Memory

- Flash memory is a non-volatile storage medium. Audio data can be loaded into Flash
- 20 memory and the power subsequently removed to conserve energy. When the audio data is needed, power can be restored, and the data quickly accessed. (Note that the secondary memory is not limited to Flash memory, as SRAM, DRAM and other types of solid state memory may also be used.)



Hard Drive

Disk memory is another non-volatile storage medium. It is economical to store vast quantities of audio data on the Disk, ready for transfer to the Flash memory for quick processing as directed by the DSP.

5

As discussed above, an important aspect of the present invention is the use of a hard drive (such as the kind typically used in a laptop or notebook computer), which is a delicate and high power consuming device. Therefore, to use a hard drive in a portable, hand-held audio player, the hard drive must be protected and its power consumption must be

10 reduced. In accordance with the present invention, the hard drive is subject to breakage if operated while the device is not stationary. This poses a significant problem for a portable, typically hand-held, device. This is one reason why hard drives have never been used for portable devices. Another reason is because they were not built for that purpose. However, hard drives have one clear advantage over other media in that they are very

15 mature technology and therefore have ridden far down the price performance curve. In the present invention, we dealt with the ease of breakage in two ways: First we conducted a careful mechanical study to find the thickness of a reasonably available absorption material needed to be used to pass a 1 meter drop test. We discovered that 0.8 inches of such material is sufficient to protect the hard drive. Second, we devised a secondary

20 stationary memory concept to be used as the active system during playback or recording. Here, the hard drive uploads an hour or so of material to the solid state memory and locks the drive. This process takes about 7 seconds. Thus, the disk medium is normally locked, especially while the unit is being carried about by the user.

25 With regard to the absorption material, it should be noted that we have not yet identified the best material to use. We have determined that the properties for such a material are to absorb a high impact and also to provide a loose enough motion for normal motion. It is analogous to a car wheel suspension system but more complicated since it needs to perform 360 degrees. In a car, one needs to prevent damage from high impact and also to

have a smooth ride over small bumps. These are competing constraints. There are many materials that may provide this but none have been selected yet. It may end up being a combination of a few. The measurements we performed were to define that deceleration needed to prevent the hard drive from breaking. This in turn allows for the definition of the types of materials we need.

Also, the Unit is designed so the hard drive can be disconnected from the Unit and the Unit can operate independently in case the user want to use the device in a particularly harsh environment or to reduce the weight and size of the product for easier mobility.

The hard drive interfaces to a PC in a number of ways: (1) through an IDE interface that is very fast and acts as an external drive for the PC; (2) through a USB (Universal Serial Bus) interface; and (3) through a parallel port interface. Other means of communication are also possible.

Other advantages of using a hard drive include:

- The hard drive can be changeable to upgrades in memory size as the densities grow.
- The volume of audio for the cost of the unit it the biggest novelty, using a mature technology, hard drive, for the purpose of providing an abundance of audio.
- Compression algorithms, such as MP3, are used to maximize the amount of audio for the amount of memory (typically, 100kbit per minute) at CD-like quality.
- We propose to use the 2.5" laptop-type drive since it is inexpensive and designed for relative durability. However, smaller drives may make more sense in the future.

- The present invention is also advantageous in high volume recording applications. One issue with portable digital recorders is that memory is expensive, and so time is relatively limited. The use of a high capacity hard drive remedies this problem.

5

- The present invention may also be expanded to video and digital cameras.
- The algorithms can be loaded from the hard drive to offer different algorithms in the future.

10

### SRAM

It may be convenient and economical to store some of the DSP's program external to the DSP itself. This Static Random Access Memory is intended for that purpose, although DRAM may also be used.

15

### DAC

Audio data, after being decompressed or otherwise manipulated by the DSP, is presented to this Digital-to-Analog Converter (DAC). The digital data, in conjunction with various clocking signals, is converted to a smoothly-varying analog signal representative of the intended sound. In addition, separation of Left and Right Audio signals takes place within the DAC.

20

### AMP

The audio signal is Amplified to a level suitable for speakers or headphones.

Other Applications

Audio can be downloaded from the Internet, stripped from personal CDs (compact disks) and loaded into the hard drive, and/or recorded and ported to the hard drive.

- 5 In addition, a wireless interface to the unit can offer a way to transfer audio/video (AV) information.

The inventive device may also be used in an automobile. For example, the unit can be built into an auto panel system and audio can be ported to the unit in a number of ways:

- 10 (1) audio can be loaded onto the unit's hard drive by a portable PC; (2) the hard drive can be removed and interfaced to a PC for loading of the audio; (3) the audio can be recorded from the automobile's radio; and/or (4) dictation can be taken in the car using a microphone.

15 Conclusion

The foregoing, although fairly complete, is not all-inclusive, and some functional blocks not directly related to the major purpose of Audio Playback may not be explicitly shown. In particular, the battery power source and any battery-sensing and battery-recharge functions have not been explicitly shown or described.

The claimed subject matter includes:

1. A portable, hand-held audio playback unit, comprising:

a disk drive including a disk storage medium for storing audio information;

5 a solid state electronic memory for use in active playback and recording, wherein audio information is transferred from the disk drive to the memory and then the disk drive is placed in a locked state; and

electronic circuitry operatively coupled to the disk drive and memory for playback of the audio information from the memory.

10

2. A portable, hand-held audio playback unit as recited in claim 1 and further comprising a shock absorbing material protecting the disk drive.

15

3. A portable, hand-held audio playback unit as recited in claim 1, wherein the electronic circuitry includes a digital signal processor (DSP), a digital-to-analog converter, and an amplifier, which together retrieve and play audio information from the solid state memory.

20

4. A portable, hand-held audio playback unit as recited in claim 1, wherein the solid state memory comprises a flash memory device.

5. A portable, hand-held audio playback unit as recited in claim 1, wherein the solid state memory comprises a dynamic random access memory (DRAM) device.

25

6. A portable, hand-held audio playback unit as recited in claim 1, wherein the solid state memory comprises a static random access memory (SRAM) device.

7. A portable, hand-held audio playback unit as recited in claim 1 and further comprising means for transferring information to and from a computer.

5 8. A portable, hand-held audio playback unit as recited in claim 1 and further comprising a display and an input device for interfacing with a user.

9. A portable, hand-held audio playback unit as recited in claim 3 and further comprising a microprocessor operatively coupled to the DSP and the display and input device.

10

10. A portable, hand-held audio playback unit as recited in claim 9, wherein the DSP is programmed to perform a plurality of functions, including communication with a computer, reading and writing data from and to the memory and disk drive, compressing and de-compressing audio data, and communicating with a microprocessor.

15

11. A portable, hand-held audio playback unit as recited in claim 9, wherein the microprocessor is programmed to interpret key depressions from a user, and to provide visual feedback and prompts on the display.

20

12. A portable, hand-held audio playback unit as recited in claim 9, wherein the microprocessor includes a clock function, by which messages and prompts keyed to date and/or time are activated without burdening the DSP.

25

13. A portable, hand-held audio playback unit as recited in claim 1, wherein the disk drive is a hard drive.

14. A portable, hand-held audio playback unit as recited in claim 1, wherein the disk drive is removable from the playback unit.

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**ABSTRACT**

A Portable Audio Playback Unit permits audio content to be written, stored and retrieved. The unit can also intelligently interact with the user, displaying non-audio information, accepting input from the user through a keyboard interface, and collecting statistics on the unit's usage. An important aspect of the unit is the use of a hard drive (such as the kind typically used in a laptop or notebook computer), which is a delicate and high power consuming device. To use a hard drive in the unit, a secondary stationary memory is used as the active system during playback or recording. The hard drive uploads an hour or so of material to the solid state memory and locks the drive. This process takes about 7 seconds. Thus, the disk medium is normally locked, especially while the unit is being carried about by the user.



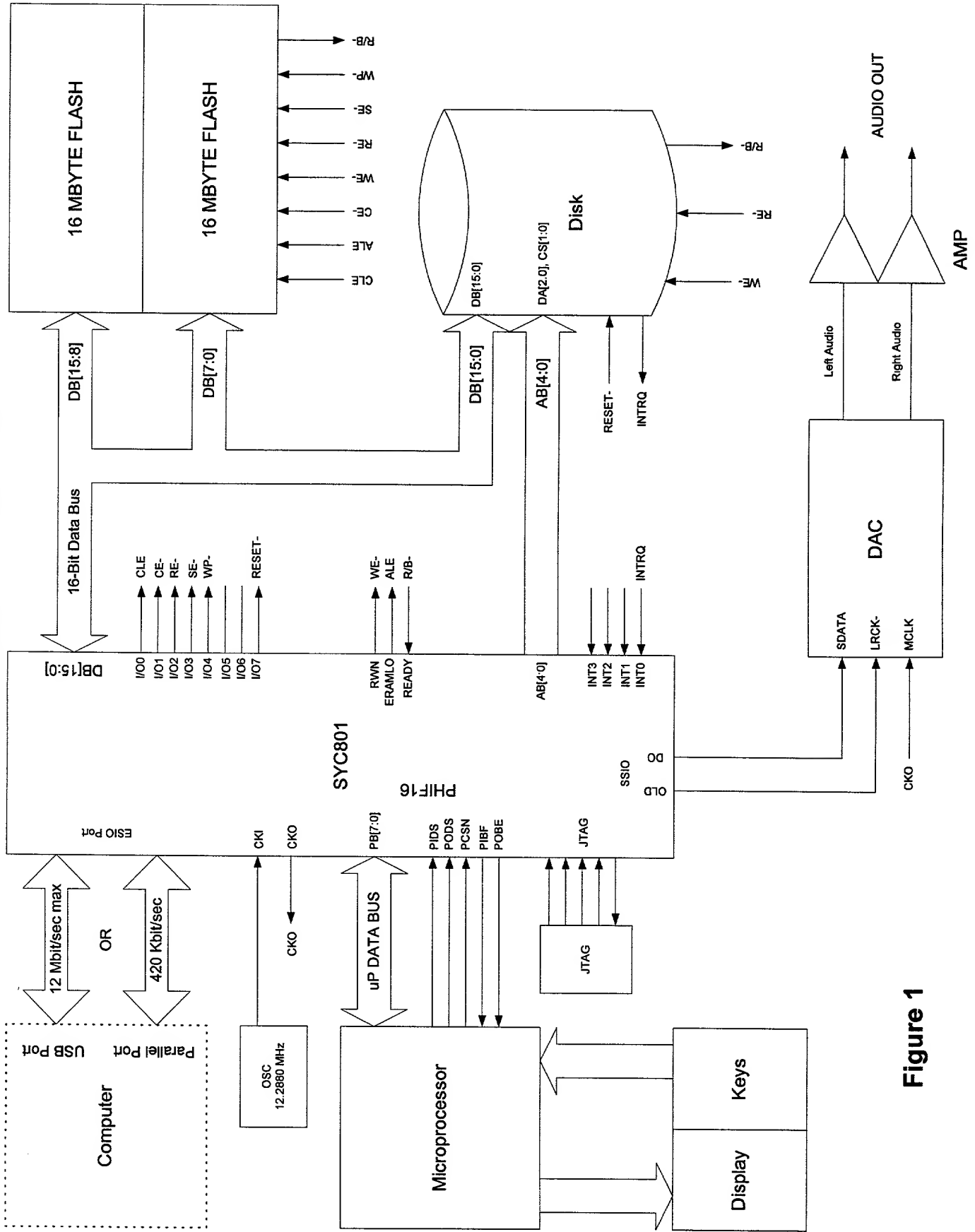


Figure 1

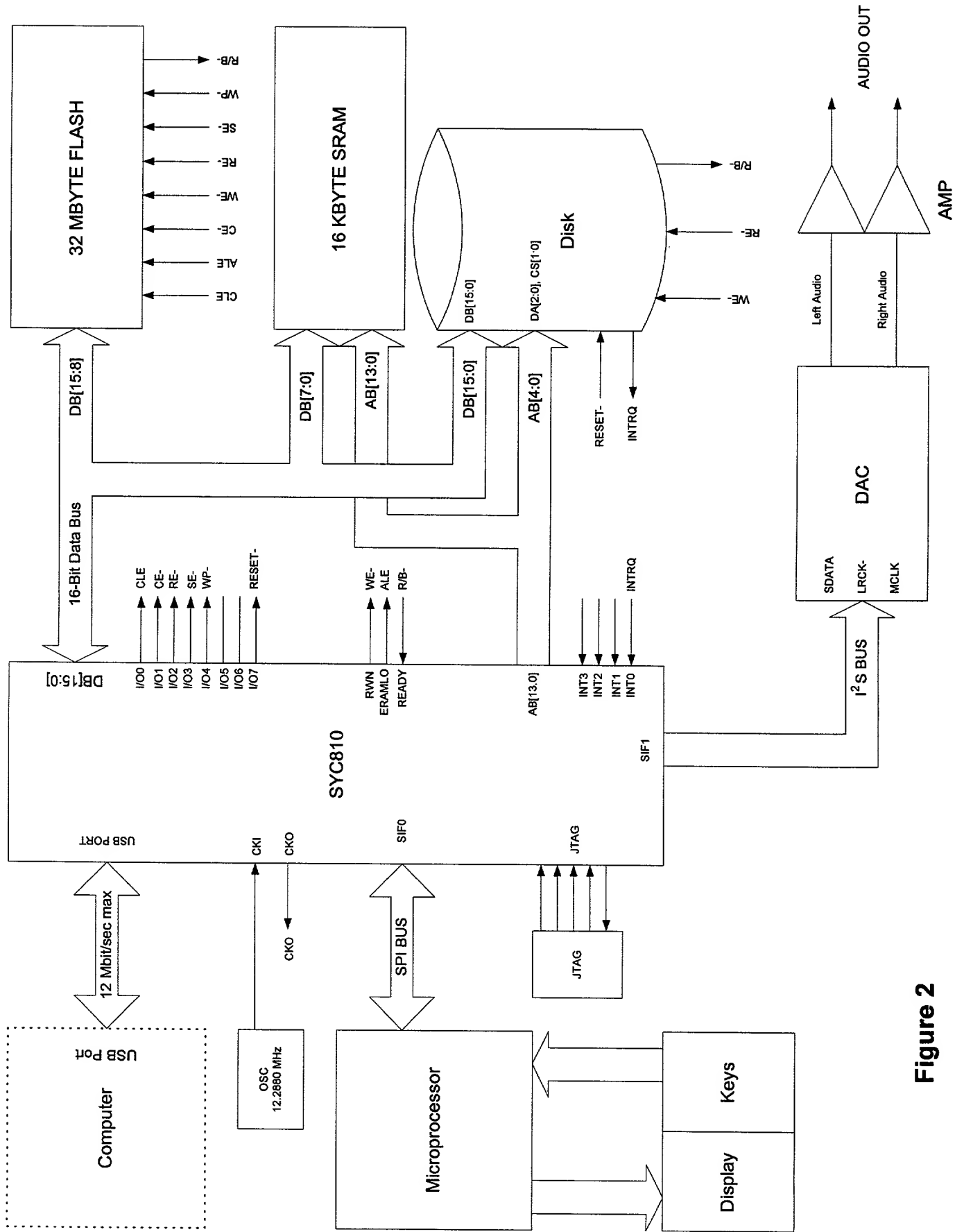


Figure 2

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

## In Re Application of:

Ari B. Naim

Group Art Unit: Not Yet Assigned

Examiner: Not Yet Assigned

For: PORTABLE AUDIO PLAYBACK UNIT

## DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; and

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a

☒ Utility Patent ☐ Design Patent

is sought on the invention, whose title appears above, the specification of which:

☒ is attached hereto.  
☐ was filed on \_\_\_\_\_ as Serial No. \_\_\_\_\_.  
☐ said application having been amended on \_\_\_\_\_.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to be material to the patentability of this application in accordance with 37 CFR § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a-d) of any **foreign application(s)** for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of any application on which priority is claimed:

Priority Claimed (If X'd)	Country	Serial Number	Date Filed
<input type="checkbox"/>	_____	_____	_____
<input type="checkbox"/>	_____	_____	_____

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to be material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

Serial Number	Date Filed	Patented/Pending/Abandoned
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

Serial Number	Date Filed
<u>60/134,989</u>	<u>May 20, 1999</u>
<u>60/129,003</u>	<u>April 13, 1999</u>

I hereby appoint the following persons of the firm of **WOODCOCK WASHBURN KURTZ MACKIEWICZ & NORRIS LLP**, One Liberty Place - 46th Floor, Philadelphia, Pennsylvania 19103 as attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

<b>John J. Mackiewicz,</b>	Registration No. 19,709
<b>Michael D. Stein,</b>	Registration No. 34,734

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Facsimile No.: (215) 568-3439

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

<b>Name:</b>  ARI B. NAIM	
<b>Mailing Address:</b>  50083 Sanderlin Court, Harmon Cove, 2 Townhouses, Secaucus, New Jersey 07094	<b>Signature</b> _____
<b>City/State of Actual Residence:</b>  Secaucus, New Jersey 07094	<b>Date of Signature:</b> _____
	<b>Citizenship:</b> <u>United States of America</u>

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